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PTO  
09/628669  
07/28/00

## REISSUE PATENT APPLICATION TRANSMITTAL

Address to:  <b>Assistant Commissioner for Patents Box Patent Application Washington, DC 20231</b>	Attorney Docket No.	<b>15444A</b>
	First Named Inventor	<b>Davis</b>
	Original Patent Number	<b>5,785,557</b>
	Original Patent Issue Date (Month/Day/Year)	<b>07/28/1998</b>
	Express Mail Label No.	<b>EL046239375US</b>

APPLICATION FOR REISSUE OF:  
(check applicable box)

☒ Utility Patent ☐ Design Patent ☐ Plant Patent

APPLICATION ELEMENTS	ACCOMPANYING APPLICATION PARTS
1. <input checked="" type="checkbox"/> * Fee Transmittal Form (PTO/SB/56) (Submit an original, and a duplicate for fee processing)	7. <input type="checkbox"/> Foreign Priority Claim (35 U.S.C. 119) (if applicable)
2. <input checked="" type="checkbox"/> Specification and Claims (amended, if appropriate)	8. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations
3. <input checked="" type="checkbox"/> Drawing(s) (proposed amendments, if appropriate)	9. <input type="checkbox"/> English Translation of Reissue Oath/Declaration (if applicable)
4. <input checked="" type="checkbox"/> Reissue Oath / Declaration (original or copy) (37 C.F.R. § 1.175)(PTO/SB/51 or 52)	10. <input type="checkbox"/> * Small Entity Statement filed in prior application, (PTO/SB/09-12) Status still proper and desired
5. Original U.S. Patent <input checked="" type="checkbox"/> Offer to Surrender Original Patent (37 C.F.R. § 1.178) (PTO/SB/53 or PTO/SB/54) or <input type="checkbox"/> Ribboned Original Patent Grant <input type="checkbox"/> Affidavit / Declaration of Loss (PTO/SB/55)	11. <input type="checkbox"/> Preliminary Amendment
6. Original U.S. Patent currently assigned? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If Yes, check applicable box(es)) <input checked="" type="checkbox"/> Written Consent of all Assignees (PTO/SB/53 or 54) <input checked="" type="checkbox"/> 37 C.F.R. § 3.73(b) Statement <input checked="" type="checkbox"/> Power of Attorney	12. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
	13. <input type="checkbox"/> Other: .....

\* NOTE FOR ITEMS 1 & 10: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

### 14. CORRESPONDENCE ADDRESS

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CERTIFICATE OF MAILING

Express Mail No. EL046239375US

Deposited July 28, 2000

I hereby certify that the attached correspondence, identified below, is being deposited with the United States Postal Service as "Express Mail Post Office to Addressee" under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, DC 20231.

By Paula M. Capuglionie

Application for Reissue


Title: ELECTRICAL CONNECTOR WITH PROTECTION  
FOR ELECTRICAL CONTACTS

Attached Correspondence:

1. Reissue Patent Application Transmittal
2. Reissue Application Fee Transmittal Form (in duplicate)
3. Reissue Patent Application
4. Declaration for Reissue Application Under 37 CFR 1.63 and 37 CFR 1.175 and Power of Attorney
5. Copy of Original Patent
6. Assignee's Statement Under 37 CFR 3.73(b); Assent of Sole Assignee of Undivided Interest in U.S. Patent No. 5,785,557 to File Application for Reissue; Offer to Surrender Original Letters Patent; and Power of Attorney
7. Inventor's Offer to Surrender Patent (37 CFR 1.178)
8. Acknowledgement Card

Tyco Electronics Docket No. 15444A

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REISSUE APPLICATION FEE TRANSMITTAL FORM						Docket Number (Optional)		
						<b>15444A</b>		
Claims as Filed - Part 1								
Claims in Patent	For	Number Filed in Reissue Application	(3) Number Extra	Small Entity		Other than a Small Entity		
				Rate	Fee	Rate	Fee	
(A) <b>18</b>	Total Claims (37 CFR 1.16(j))	(B) <b>37</b>	**** <b>17</b> =	x \$	=	or	x \$ <b>18</b> = <b>306</b>	
(C) <b>4</b>	Independent Claims (37 CFR 1.16(i))	(D) <b>9</b>	* <b>5</b> =	x \$	=		x \$ <b>78</b> = <b>390</b>	
Basic Fee (37 CFR 1.16(h))					\$		\$ <b>690</b>	
Total Filing Fee					\$	OR	\$ <b>1386</b>	
Claims as Amended - Part 2								
	(1) Claims Remaining After Amendment		(2) Highest Number Previously Paid For	(3) Extra Claims Present	Small Entity		Other than a Small Entity	
					Rate	Fee	Rate	Fee
Total Claims (37 CFR 1.16(j))	***	MINUS	**	=	x \$	=	or	x \$ =
Independent Claims (37 CFR 1.16(i))	***	MINUS	*****	=	x \$	=		x \$ =
Total Additional Fee					\$	OR	\$	
<p>* If the entry in (D) is less than the entry in (C), Write "0" in column 3.</p> <p>** If the "Highest Number of Total Claims Previously Paid For" is less than 20, Write "20" in this space.</p> <p>*** After any cancellation of claims</p> <p>**** If "A" is greater than 20, use (B - A); if "A" is 20 or less, use (B - 20).</p> <p>***** "Highest Number of Independent Claims Previously Paid For" or Number of Independent Claims in Patent (C).</p>								
<p><input checked="" type="checkbox"/> Please charge Deposit Account No. <u>23-1950</u> in the amount of <u>\$1386</u>. A duplicate copy of this sheet is enclosed.</p> <p><input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees under 37 CFR 1.16 or 1.17 which may be required, or credit any overpayment to Deposit Account No. <u>23-1950</u>. A duplicate copy of this sheet is enclosed.</p> <p><input type="checkbox"/> A check in the amount of \$ _____ to cover the filing / additional fee is enclosed.</p>								
<u>July 28, 2000</u> Date		 Signature of Applicant, Attorney or Agent of Record						
<u>Bradley N. Ditty</u> Typed or printed name								

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In the Matter of the Application for Reissue of:

Wayne Samuel Davis

U.S. Patent No. 5,785,557

Issued: July 28, 1998

For: ELECTRICAL CONNECTOR WITH PROTECTION  
FOR ELECTRICAL CONTACTS

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Assistant Commissioner for Patents

Washington, DC 20231

**REISSUE APPLICATION BY THE INVENTOR  
OFFER TO SURRENDER PATENT (37 CFR 1.178)**

This is part of the application for a reissue patent based on the original patent, U.S. Patent No. 5,785,557, granted on July 28, 1998, on the invention entitled:

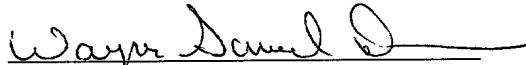
ELECTRICAL CONNECTOR WITH PROTECTION  
FOR ELECTRICAL CONTACTS

The undersigned is the sole inventor of the original patent and hereby offers to surrender the original patent.

The Whitaker Corporation, now sole owner by assignment, and on whose behalf and with whose assent the accompanying application is made, submits herewith a certificate under 37 CFR 3.73(b) and written consent to this reissue application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application, any patent issued thereon, or any patent to which this declaration is directed.

Dated: 7-27-00

  
Wayne Samuel Davis  
Inventor

# ELECTRICAL CONNECTOR WITH PROTECTION FOR ELECTRICAL CONTACTS

## RELATED APPLICATION INFORMATION

This is a Continuation-in-Part of U.S. patent application Ser. No. 08/005,690 filed Jan. 19, 1993, now U.S. Pat. No. 5,295,843.

## FIELD OF THE INVENTION

The present invention relates to an electrical connector having electrical contacts, wherein the contacts are prevented from being wiped with insulation during mating connection with another, mating connector.

## BACKGROUND OF THE INVENTION

An electrical connector, known from U.S. Pat. No. 3,760, 335, comprises, an insulating housing and conductive signal contacts. The contacts are grouped in pairs, with an insulative divider of the housing separating one contact of the pair from the other contact of the pair. Multiple pairs of the contacts are distributed along the insulative divider. The pairs of contacts are especially suitable for connection to twisted pair wires used in the communications industry for data and voice transmission. Each pair of the twisted pair wires are connected to one pair of the contacts. To shield the connector from ESD, electrostatic discharge, a conductive metal shell surrounds the insulative housing of the connector. For example, a shielded connector is disclosed in U.S. Pat. No. 5,158,481.

A desirable shielded connector provides ESD protection for the electrical contacts of the connector during mating connection of the connector with another, mating connector. During mating connection of two mating connectors, an electrostatic voltage charge on one or both of the connectors should be discharged to ground electrical potential via the shield on one or both of the connectors, whereby the voltage charge is shunted away from electrical contacts in the connectors.

## SUMMARY OF THE INVENTION

A feature of the invention resides in a shield covered connector with tips of electrical contacts being recessed from a mating end of the connector, and being covered by insulative material that provides ESD protection for the contacts.

Another feature of the invention resides in a connector with insulative wiping surfaces that provide ESD protection for electrical contacts, the wiping surfaces being offset from contact surfaces of the contacts, in the direction of mating insertion, to avoid insulative material being wiped onto the contact surfaces during mating connection with another, mating connector.

## DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will now be described by way of example with reference to the drawings according to which;

FIG. 1 is a fragmentary perspective view of an electrical connector;

FIG. 2 is a section view of the connector shown in FIG. 1;

FIG. 3 is a fragmentary perspective view of another, mating electrical connector for mating connection with the connector shown in FIG. 1;

FIG. 4 is a section view of the connector shown in FIG. 3;

FIG. 5 is an elevation view in section of the connector shown in FIG. 4;

FIG. 6 is a view similar to FIG. 5, illustrating signal contacts in the connector shown in FIG. 3;

FIG. 7 is an elevation view in section of the connectors shown in FIGS. 1 and 3 prior to mating engagement with each other;

FIG. 8 is a view similar to FIG. 7, illustrating the connectors in mating engagement with each other; and

FIG. 9 is a section view similar to FIG. 8, illustrating mating engagement of power contacts of the connectors.

With reference to FIGS. 1 through 6, each of two mating embodiments of an electrical connector 1 comprises, an insulative housing 2, multiple pairs 3 of conductive signal contacts 4, 5, accompanied by at least one power contact 6, in the housing 2. The pairs 3 of the signal contacts 4, 5 are distributed along an insulative divider 7 in an interior 8 of the housing 2. The signal contacts 4, 5 of each pair 3 are on opposite sides of the divider 7 that separates the signal contacts 4, 5 of each pair 3. The signal contacts 4, 5 are in rows, and are parallel to one another. A pair of contact fingers 9 on the power contact 6 are on opposite sides of the divider 7, and extend parallel to the signal contacts 4, 5. The surface area of each of the fingers 9 is larger than that of each of the signal contacts 4, 5, and is sufficiently broad to radiate heat from electrical power dissipation. In addition, each of the fingers 9 is of greater mass than each of the signal contacts 4, 5 to carry electrical current. When electrical current is transmitted by the power contact 6, dissipation of electrical power generates heat. The heat is radiated from the surface area of the power contact 6. A larger surface area and a higher mass of the power contact 6 will limit the temperature attained by the power contact 6.

The divider 7 bridges between, and is joined to side walls 10, 11 of the housing 2. The divider 7 extends from a front mating end 12 of the housing 2 and rearwardly in the interior 8 of the housing 2. Spaced apart partitions 13 in the interior 8 bridge between the divider 7 and a top wall 14 of the housing 2, and between the divider 7 and a bottom wall 15 of the housing 2. The partitions 13 join the divider 7 and the top and bottom walls 14, 15. The walls 14, 15 bridge between and join the side walls 10, 11 to form the exterior of the housing 2. Contact receiving cavities 16 in the housing 2 are defined between the partitions 13 and extend behind the divider 7 to receive the signal contacts 4, 5. With respect to the power contact 6, FIGS. 5 and 9, the fingers 9 are connected to a body portion 17 having a surface area sufficiently broad to radiate heat from electrical power dissipation. A pocket 18 in the housing 2, between a side wall 14, 15 and a partition 13, and behind the divider 7, receives the body portion 17. Each of the contact receiving cavities 16 is smaller than the pocket 18. The power contact 6 can be inserted in the housing 2 unmistakably in the pocket 18 that is larger than each of the smaller, contact receiving cavities 16 that is smaller than the body portion 17. The divider 7 extends forwardly of the partitions 13, and is provided with a series of grooves 19 on its opposite sides aligned with the contact receiving passages. The grooves 19 receive the signal contacts 4, 5 and the contact fingers 9. The grooves 19 that receive the contact fingers 9 are larger than the grooves 19 that receive the signal contacts 4, 5. Projecting lances 20 on each signal contact 4, 5, FIGS. 7 and 8, and on the power contact 6 impinge against walls 21 of the housing 2, and resist withdrawal of the contacts 4, 5 and 6

from the grooves 19. Each of the signal contacts 4, 5 and the power contact 6 is of unitary construction, stamped and formed from a strip of metal.

With respect to FIGS. 3-7, a circuit board connector 1, meaning a version of the connector 1 for mounting on a circuit board, not shown, will be described. The divider 7 is spaced apart from the top and bottom walls 14, 15 of the housing 2. The grooves 19 face toward the top and bottom walls 14, 15. The pairs 3 of signal contacts 4, 5 are adapted to be connected to a circuit board, not shown. An electrical termination 22 in the form of a post extends laterally downward from each of the signal contacts 4, 5 for connection to a circuit board, not shown, and more particularly, to a plated aperture, not shown of the circuit board. The terminations 22 extend laterally downward by bending the signal contacts 4, 5 along their lengths, the signal contact 4 being longer in length than the signal contact 5.

With reference to FIGS. 5 and 9, the body portion 17 has a thickness that is the same thickness as each of the contact fingers 9. The fingers 9 are bent to extend outward from the body portion 17 such that the thickness of the body portion 17 is in a plane perpendicular to a plane of thickness of each of the contact fingers 9. A termination 22 in the form of a pair of posts extend laterally downward of each body portion 17 for connection to a circuit board, not shown, and more particularly, for connection in plated apertures, not shown, of the circuit board. Each of the terminations 22 is larger in surface area and mass than that of each of the terminations 22 on the signal contacts 4, 5, thereby to conduct electrical current, and to radiate heat resulting from dissipation of electrical power.

The terminations 22 are on the signal contacts 4, 5 where they emerge from a rear of the divider 7. The terminations 22 are on the power contact 6 where it emerges from a rear of the divider 7. A series of slots 23 in the bottom wall 15 of the housing 2 have open ends communicating with a rear end 24 of the bottom wall 15. The terminations 22 project through the slots 23, with the terminations 22 of each pair 3 of the contacts 4, 5 being spaced apart along the same slot 23. The bottom wall 15 of the housing 2 provides a base from which knob shaped feet 25, FIGS. 6-8, extend for resting against a circuit board, not shown.

With reference to FIGS. 1, 2 and 7-9, a cable connector 1, meaning a connector 1 for connection to an electrical cable, not shown, will be described. The cable connector 1 is adapted for mated connection with the version of the connector 1, FIGS. 3 and 4, for mounting on a circuit board, not shown. The divider 7 of the cable connector 1 is bifurcated by a passage 26 at the front mating end 12 for receiving the divider 7 of the version of the connector 1 for mounting on a circuit board, not shown. The grooves 19 face toward the passage 26, such that the contacts 4, 5 on opposite sides of the divider 7 face toward the passage 26. The pairs 3 of signal contacts 4, 5 are adapted to be connected to respective pairs 3 of signal wires 27 of a single electrical cable, not shown, or of multiple electrical cables, not shown. The signal wires 27 can be a twisted pair of signal wires 27. In FIG. 7, each of the signal contacts 4, 5 further comprises a termination 22 having arms 28 that extend outward laterally of each other, the arms being bendable into an open barrel configuration to encircle and connect with the signal wire 27. Another set of arms 29 extend laterally of each other, the arms 29 being bendable into an open barrel configuration to encircle and connect with insulation 30, FIG. 8, encircling the signal wire 27.

With reference to FIG. 9, the contact fingers 9 extend from a connection to an electrical power transmitting wire 31

larger in diameter than each of the signal wires 27. The wire 31 may comprise an electrical power cable. In particular, the body portion 17 comprises a termination 22 having sets of arms 32, 33 that extend outward laterally of each other, the arms 32 being bendable into an open barrel configuration to encircle and connect with the electrical power transmitting wire 31. The wire 31 is larger in diameter than each of the signal wires 27 to carry electrical current. The signal wires 27 are smaller in diameter, as they are required to transmit electrical signals of which the voltage, not the electrical power, is of paramount importance. The set of arms 33 extend laterally of each other, and are bendable into an open barrel configuration to encircle and connect with insulation encircling the wire 31.

With reference to FIG. 1, projecting locks 34 are on the exterior of the wall 14. The locks 34 are in the form of inclined wedge projections tapering toward the front mating end 12. The mating end 12 has a profile including chamfers 35, FIG. 2, that intersect the wall 14, making the wall 14 less than the wider wall 15, thereby providing the connector 1 with polarity for orienting the mating end 12.

With reference to FIGS. 1 and 2, shielding 36 for both electrical connectors 1, comprises; two conductive, telescopic shells 37, 38 that fit and slide one within the other. Each of the shells 37, 38 is of unitary construction, stamped and formed from a metal plate. The shells 37, 38 each are bent on themselves, forming wrapped sections, and forming telescopic first and second tubular enclosures 39, 40, with open front ends 41, 42 defining mating ends of the shells 37, 38.

A number of folds 47 in the tubular enclosure 39 conform to an exterior shape of the housing 2 of the connector 1. The folds 47 define the circumference of the profile on the mating end 41. Folds 47 in the enclosure 40 define the circumferences of the open ends 42, 44. The folds 47 conform the shell 38 with the shape of the first shell 37. A seam 45 extends along the tubular enclosure 39. Multiple locks 48, in the form of openings, located on both sides of the seam 45, lock to the connector 1 by locking to the projecting locks 34 on the housing 2. An overmold 57, FIG. 8, in the form of a molded insulation of desired shape, covers and adheres to the cable 25 and the strain relief portions 51, 52.

With reference to FIGS. 2 and 5-9 both connectors 1 will be described further. Flanges 58 on the divider 7 of the housing 2 overhang the front ends of the grooves 19 and overhang both lateral sides of each of the grooves 19. The flanges 58 overlap front tips on the contacts 4, 5 and front tips of the contact fingers 9 that are in respective grooves 19. The front tips of the contacts 4, 5 and of the contact fingers 9 are recessed from the mating end 12 of the housing 2.

With reference to the circuit board connector 1 shown in FIGS. 3 and 4, each of the contacts 4, 5, and the contact fingers 9, are inclined and bowed along their lengths to project outwardly bowed from the grooves 19. The bowed contacts 4, 5, and the bowed contact fingers 9, are resiliently deflectable by flattening their bowed configurations. For example, during mating connection of the connectors 1, one to the other, FIG. 8, the contacts 4, 5 and the contact fingers 9, of one connector 1, are matingly inserted into the other, mating connector 1. The bowed contacts 4, 5, and the bowed contact fingers 9, of the circuit board connector 1 engage respective contacts 4, 5, and contact fingers 9, of the cable connector 1, and are flattened somewhat to exert pressure engagement with the contacts 4, 5, and the contact finger 9, of the cable connector 1.



Within the passage 26 and on the mating end 12 of the housing 2, are multiple, insulative wiping surfaces 61 in the form of inclined ramps. The wiping surfaces 61 are spaced apart one from another, and appear as a castellated structure. The wiping surfaces 61 are interposed between the tips of the contacts 4, 5 and the mating end 12 of the housing 2. The wiping surfaces 61 are over the front tips of the contacts 4, 5 and of the contact fingers 9. The wiping surfaces 61 are in axial alignment with the edge margins 59 on the contacts 4, 5, and on the contact fingers 9, and are offset laterally from the contact surfaces 60 on the contacts 4, 5 and on the contact fingers 9. The wiping surfaces 61 project along paths of mating insertion of the contacts 4, 5, and the contact fingers 9, and are interposed between the mating end 12 of the housing 2 and the exposed contacts 4, 5 and the exposed contact fingers 9.

During mating engagement of one connector 1 and the other connector 1, the contacts 4, 5 of the circuit board connector 1 will wipe, or stroke against, the contacts 4, 5 of the cable connector 1, as shown in FIG. 8. It is desired to avoid wiping of the contacts 4, 5 and the contact fingers 9 against the insulative material 61 of the housings 2, particularly at the same places where the contacts 4, 5 engage one another, and where the contact fingers 9 engage one another. Such wiping against the insulative material 61 would tend to apply insulative material on the contacts 4, 5 and on the contact fingers 9. The presence of insulative material on the contacts 4, 5 and on the contact fingers 9, where they engage one another during mating connection, would reduce electrical conductivity, undesirably. The contact surfaces 60 on

respective contacts 4, 5 are rearward of the insulative wiping surfaces 61 in the passage 26. The contacts 4, 5 of the circuit board connector 1 wipe against the insulative wiping surfaces 61 prior to engagement with the contacts 4, 5 of the cable connector 1. However, the insulative wiping surfaces 61 are offset laterally from the contact surfaces 60 of the contacts 4, 5 in the cable connector 1. The mating contacts 4, 5 of the circuit board connector 1 are axially aligned in the direction of mating insertion with the contacts 4, 5 of the cable connector 1. The wiping surfaces 61 are aligned with the side margins 59 of the contacts 4, 5 and the contact fingers 9, of the circuit board connector 1, in the direction of mating insertion. The middle surface areas, between the lateral side margins 59, of the contacts 4, 5 and the contact fingers 9, of the circuit board connector 1, are offset laterally of the wiping surfaces 61, during mating insertion into the cable connector 1. These middle surface areas pass between the insulative wiping surfaces 61, and are unwiped by the insulative wiping surfaces 61 during passage of the side margins of the contacts 4, 5 and the contact fingers 9 over the wiping surfaces 61. The contact surfaces of the contacts 4, 5 and the contact fingers 9, of the cable connector 1, engage these unwiped, middle surface areas of the mating contacts 4, 5 and contact fingers 9, of the circuit board connector 1. Thereby, the presence of insulative material is avoided on the contacts 4, 5 and on the contact fingers 9, at the locations where they engage one another during mating connection of the connectors 1.

An advantage of the invention resides in a connector 1 with tips of contacts 4, 5 being recessed from a mating end 12 of the connector 1 and covered by insulative material that provides ESD protection for the contacts 4, 5.

Another advantage of the invention resides in a connector 1 with insulative wiping surfaces 61 that provide ESD protection for electrical contacts 4, 5, the wiping surfaces 61 being offset from the contacts 4, 5 in the direction of mating insertion to avoid insulative material being wiped onto contact surfaces of the contacts 4, 5 during mating connection with another, mating connector 1.

Other advantages, and other embodiments and modifications of the invention are intended to be covered by the spirit and scope of the accompanying claims.

1 claim:

1. An electrical connector comprising: an insulative housing, conductive contacts within an interior of the housing, wiping surfaces on a mating end of the housing, conductive surfaces on the contacts being rearward of the wiping surfaces and offset laterally of the wiping surfaces to engage unwiped surface areas of mating contacts of another, mating connector, which mating contacts wipe against the wiping surfaces prior to engagement of the unwiped surface areas of the mating contacts with the conductive surface areas of the contacts, the wiping surfaces projecting along paths of mating insertion of the contacts, and being interposed between the contacts and a front edge of the housing.

2. An electrical connector as recited in claim 1, wherein, an insulative divider separates one of the contacts from another of the contacts of each pair of the contacts.

3. An electrical connector as recited in claim 1, further comprising: an insulative divider separating one of the contacts from another of the contacts of each pair of the contacts, at least one conductive power contact having a pair of contact fingers on opposite sides of the divider, the contact fingers having a surface area sufficiently broad to radiate heat from electrical power dissipation, and the fingers extending parallel to the contacts.

4. An electrical connector as recited in claim 1, wherein, the wiping surfaces are interposed between the contacts and

a front edge of the housing, and conductive shielding encircles the housing, a front edge of the shielding being closer to the front edge of the housing than the contacts.

5. An electrical connector as recited in claim 1, wherein, front tips of the contacts are recessed from a front edge of the housing, and the wiping surfaces are interposed between the tips of the contacts and the front edge of the housing.

6. An electrical connector as recited in claim 1, wherein, the wiping surfaces cover front tips of the contacts.

7. An electrical connector as recited in claim 1, wherein, the wiping surfaces are ramps.

✓ 8. An electrical connector comprising: an insulative housing, conductive contacts within an interior of the housing, wiping surfaces on a mating end of the housing, conductive surfaces on the contacts being rearward of the wiping surfaces and offset laterally of the wiping surfaces to engage unwiped surface areas of mating contacts of another, mating connector, which mating contacts wipe against the wiping surfaces prior to engagement of the unwiped surface areas of the mating contacts with the conductive surface areas of the contacts, and the conductive surfaces being raised with respect to edge margins of the contacts received in grooves in the housing.

✓ 9. An electrical connector comprising:

an insulative housing, conductive contacts within an interior of the housing, wiping surfaces on a mating end of the housing and interposed between the contacts and a front edge of the housing, with the wiping surfaces projecting along paths of mating insertion of mating contacts of another, mating connector, conductive surfaces on the contacts being offset laterally of the wiping surfaces and being rearward of the wiping surfaces to engage said mating contacts of said another, mating connector, which mating contacts pass the wiping surfaces prior to engagement with the conductive surfaces, and a conductive shield surrounding the mating end of the housing, the wiping surfaces being closer to the shield than the contacts.

10. An electrical connector as recited in claim 9, wherein, an insulative divider separates one of the contacts from another of the contacts of each pair of the contacts.

11. An electrical connector as recited in claim 9, further comprising: an insulative divider separating one of the

contacts from another of the contacts of each pair of the contacts, at least one conductive power contact having a pair of contact fingers on opposite sides of the divider, the contact fingers having a surface area sufficiently broad to radiate heat from electrical power dissipation, and the fingers extending parallel to the contacts.

12. An electrical connector as recited in claim 9, wherein, the wiping surfaces are interposed between the contacts and a front edge of the housing, and conductive shielding encircles the housing, a front edge of the shielding being closer to the front edge of the housing than the contacts.

13. An electrical connector as recited in claim 9, wherein, front tips of the contacts are recessed from a front edge of the housing, and the wiping surfaces are interposed between the tips of the contacts and the front edge of the housing.

14. An electrical connector as recited in claim 9, wherein, the wiping surfaces cover front tips of the contacts.

15. An electrical connector as recited in claim 9, wherein, the wiping surfaces are ramps.

16. An electrical connector comprising: an insulative housing, conductive contacts within an interior of the housing, wiping surfaces on a mating end of the housing, conductive surfaces on the contacts being offset laterally of the wiping surfaces and being rearward of the wiping surfaces to engage mating contacts of another, mating connector which mating contacts pass the wiping surfaces prior to engagement with the conductive surfaces, and a conductive shield surrounding the mating end of the housing, the wiping surfaces being closer to the shield than the contacts, and the conductive surfaces being raised with respect to edge margins of the contacts received in grooves in the housing.

17. An electrical connector as recited in claim 9 wherein, the conductive surfaces on each contact are between edge margins on each contact, and the wiping surfaces are offset from the conductive surface areas on the contacts, and are in alignment with the edge margins on the contacts.

18. An electrical connector as recited in claim 1 wherein, the conductive surfaces on each contact are between edge margins on each contact, and the wiping surfaces are offset from the conductive surfaces on the contacts, and are in alignment with the edge margins on the contacts.

\* \* \* \* \*



limit the temperature of the first power contact and the second power contact.

✓ 23. Mateable electrical connectors comprising:

5        a first and a second electrical connector having  
mateable signal contacts and at least one first power  
contact mateable with at least one second power contact;  
the first power contact having opposed contact  
fingers extending from a first body portion and the  
10   second power contact having opposed contact surfaces;  
wherein the opposed contact fingers of the first  
power contact are received between the opposed contact  
surfaces of the second power contact such that the  
contact fingers resiliently deflect inwardly and exert  
15   pressure on the opposed contact surfaces.

24. The mateable electrical connectors of claim 23,  
wherein the first power contact and the second power  
contact have a surface area sufficiently broad to  
20   radiate heat resulting from electrical power  
dissipation.

25. The mateable electrical connectors of claim 24,  
wherein the first power contact and the second power  
25   contact have a greater mass than the signal contacts in  
order to carry greater electrical current and thereby  
limit the temperature of the first power contact and the  
second power contact.

30 26. The mateable electrical connectors of claim 23,  
wherein the first power contact and the second power  
contact have lances which retain them in the first  
electrical connector and second electrical connector,

respectively.

✓27. Mateable electrical connectors, comprising:

- 5 a first electrical connector having at least one  
first power contact; and  
a second electrical connector having at least one  
second power contact mateable with the at least one  
first power contact;  
the at least one first power contact having a body  
10 portion with opposed contact fingers extending  
therefrom, thereby providing a surface area sufficiently  
broad to radiate heat resulting from electrical power  
dissipation;  
the at least one second power contact having  
15 opposed contact surfaces, thereby also providing a  
surface area sufficiently broad to radiate heat  
resulting from electrical power dissipation;  
wherein upon mating the first electrical connector  
with the second electrical connector, the contact  
20 fingers deflect inwardly upon insertion between the  
opposed contact surfaces, thereby exerting force against  
the opposed contact surfaces.

25 28. The mateable electrical connectors of claim 27,  
wherein the contact fingers have outwardly bowed  
portions.

30 29. The mateable electrical connectors of claim 27,  
wherein the at least one first power contact and the at  
least one second power contact have lances which retain  
them within the first electrical connector and the  
second electrical connector, respectively.

30. An electrical connector comprising:  
an insulative housing carrying signal contacts and  
power contacts,  
the power contacts having opposed contact fingers  
5 which extend from a body portion, the opposed contact  
fingers being inwardly deflectable upon mating within a  
mating power contact of a mating electrical connector,  
wherein the power contacts have a surface area  
greater than a surface area of the signal contacts in  
10 order to effectively radiate heat resulting from  
electrical power dissipation.

31. The electrical connector of claim 30, wherein the  
contact fingers have outwardly bowed portions.

32. The electrical connector of claim 30, wherein  
termination portions are provided on the body portion.

33. The electrical connector of claim 30, wherein the  
20 power contacts have lances to retain the power contacts  
within the insulative housing.

34. The electrical connector of claim 30, wherein the  
power contacts have a greater mass than the signal  
25 contacts in order to more carry greater electrical  
current and thereby limit the temperature of the power  
contacts.

35. An electrical connector comprising:  
30 an insulative housing having signal contacts and  
power contacts,  
the power contacts having opposed contact surfaces  
for receiving deflectable contact fingers of a mating



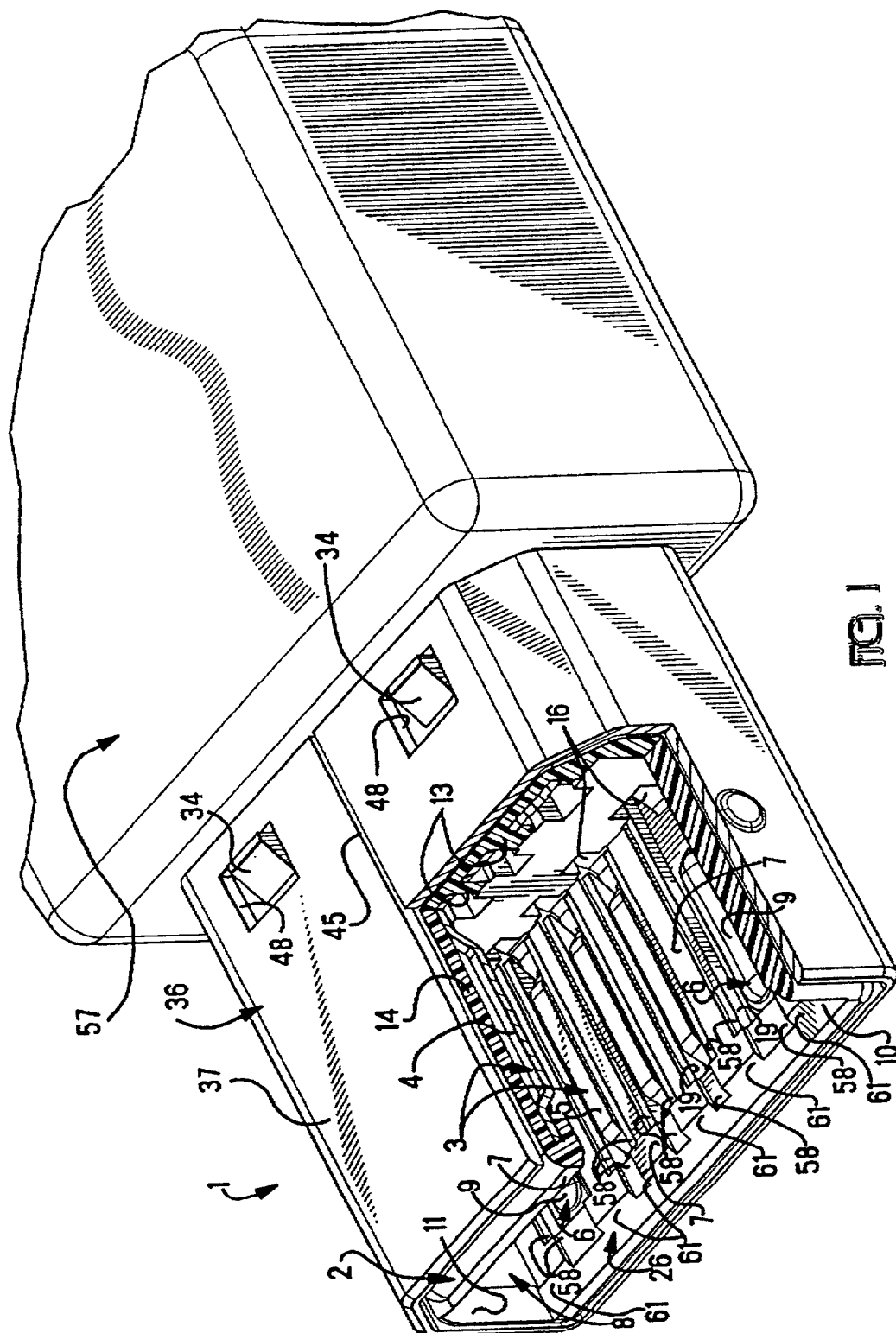
power contact of a mating electrical connector  
therebetween,

5       wherein the power contacts have a surface area  
greater than a surface area of the signal contacts in  
order to effectively radiate heat resulting from  
electrical power dissipation.

10       36. The electrical connector of claim 35, wherein the  
power contacts have lances to retain the power contacts  
within the insulative housing.

15       37. The electrical connector of claim 35, wherein the  
power contacts have a greater mass than the signal  
contacts in order to carry greater electrical current  
and thereby limit the temperature of the power contacts.

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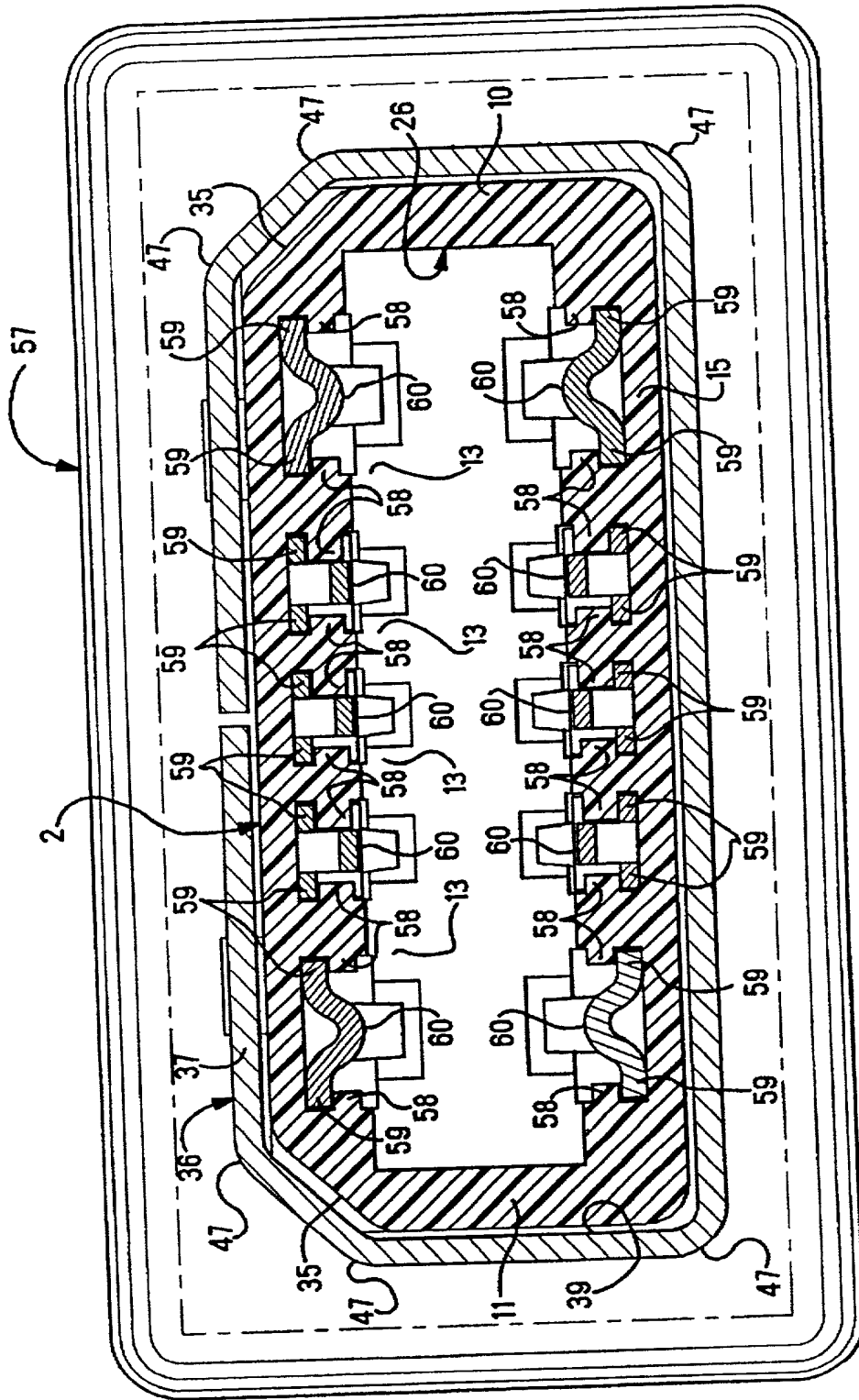
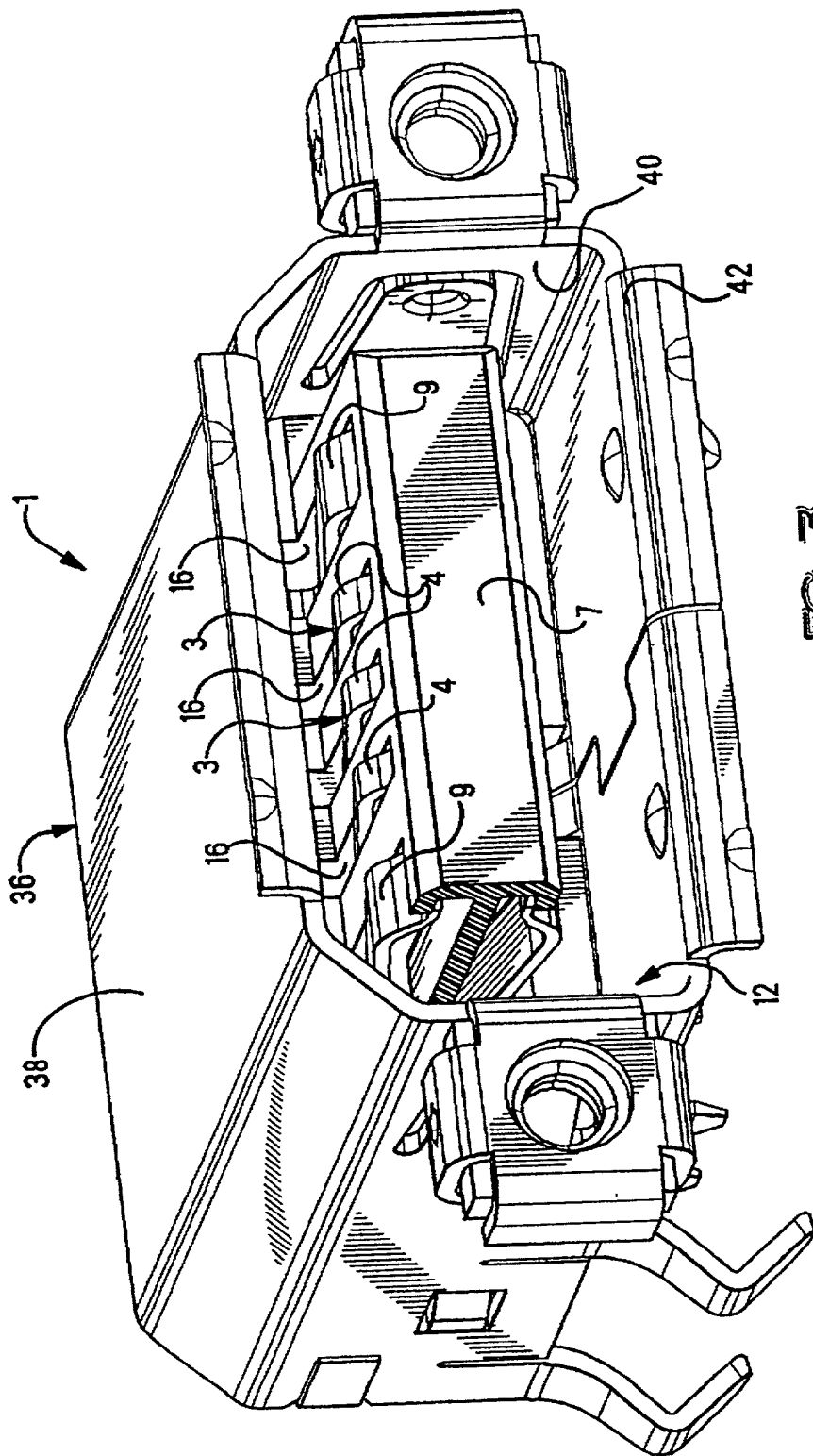
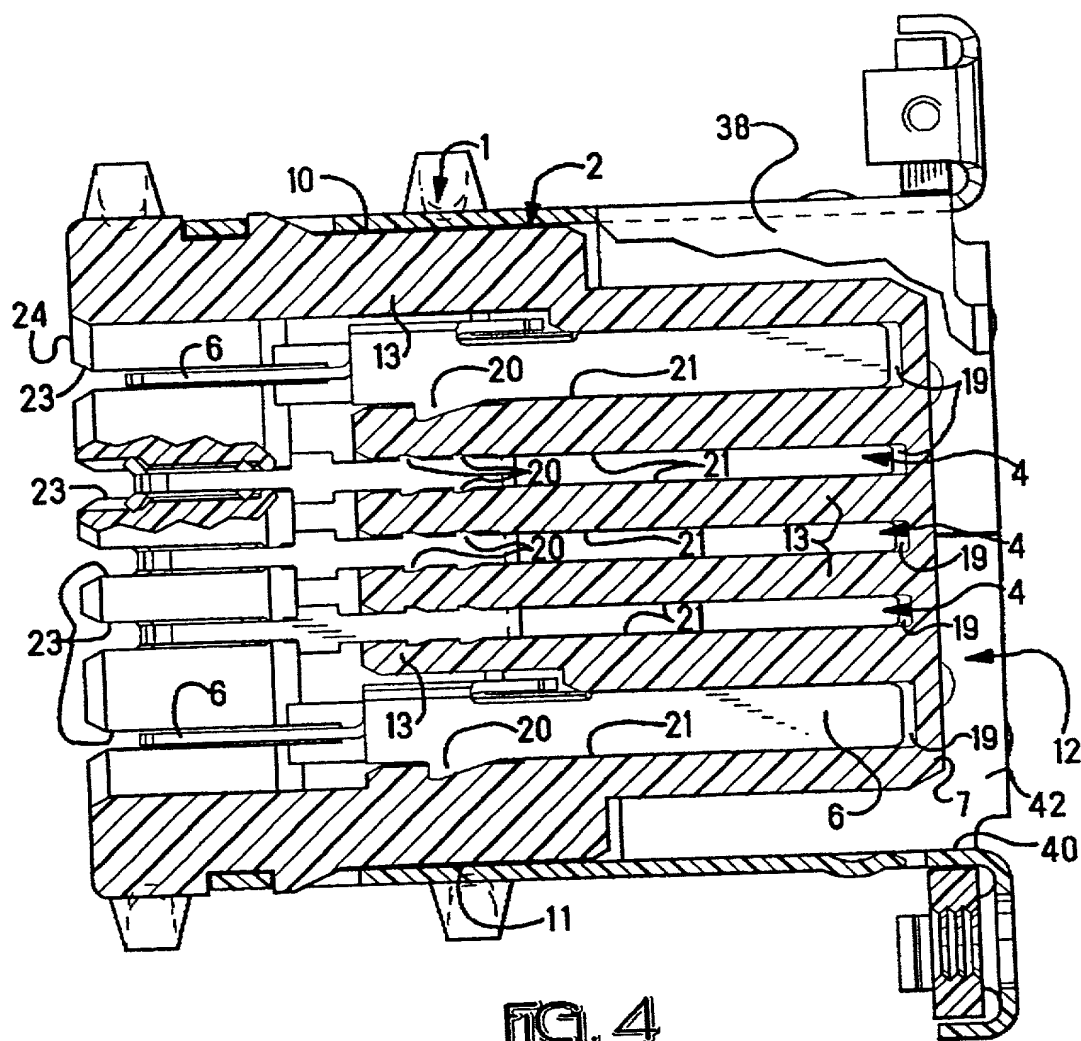
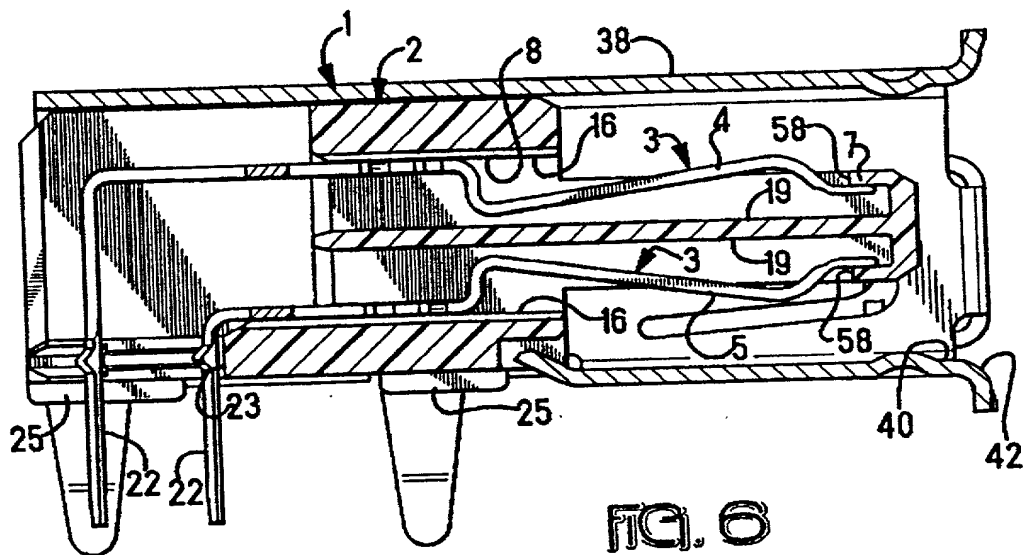
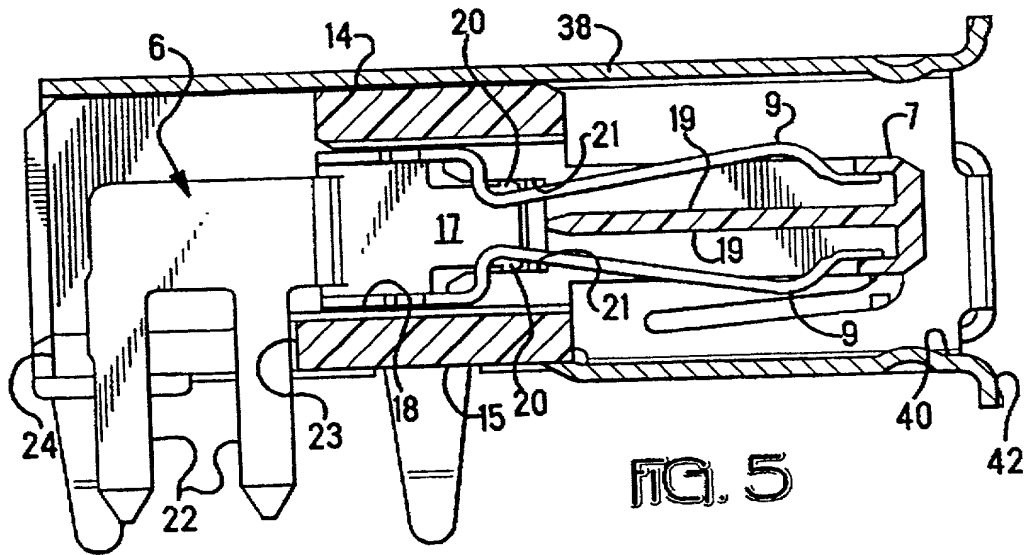
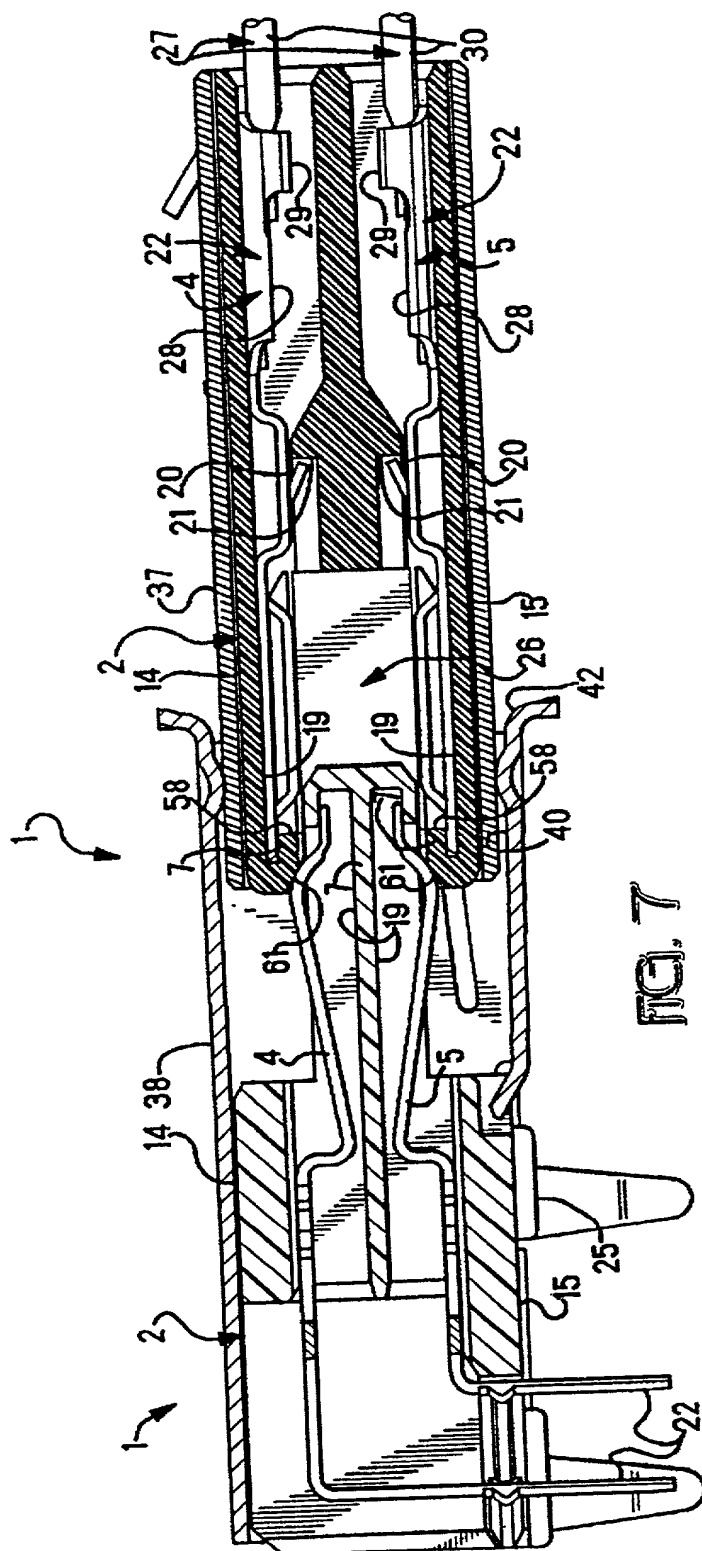


FIG. 2









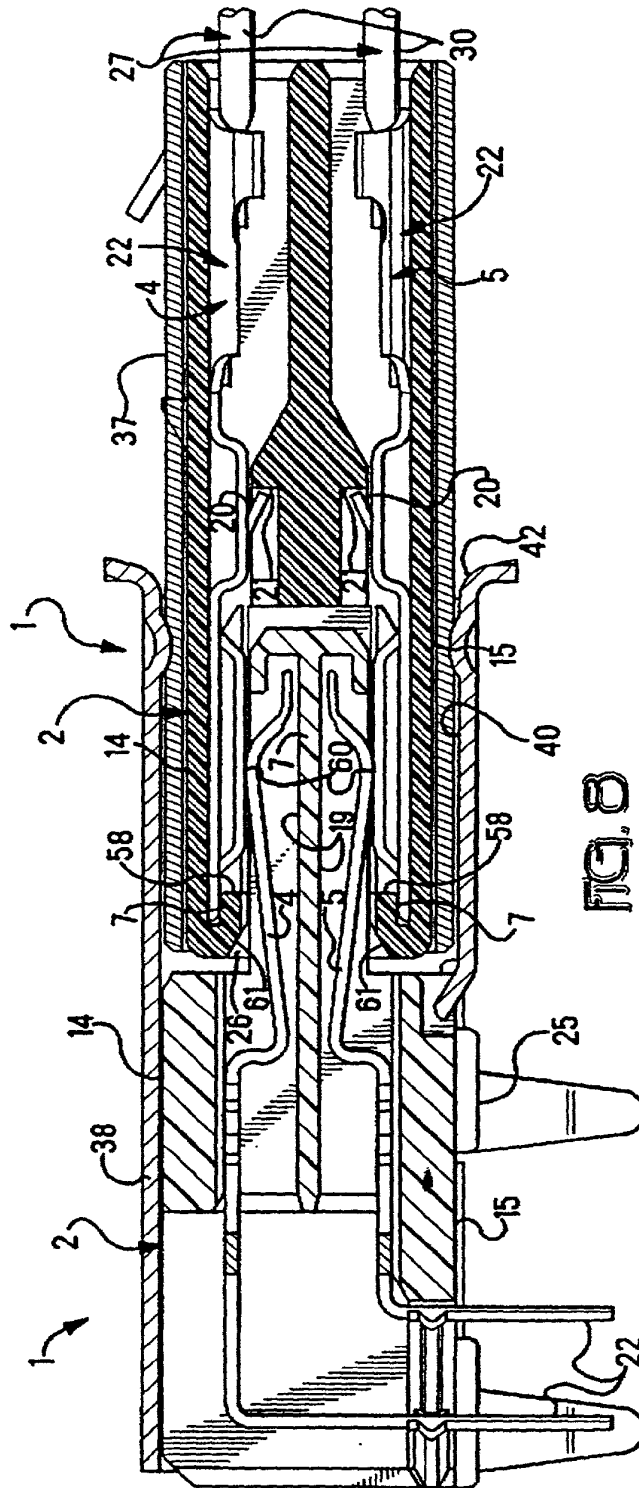
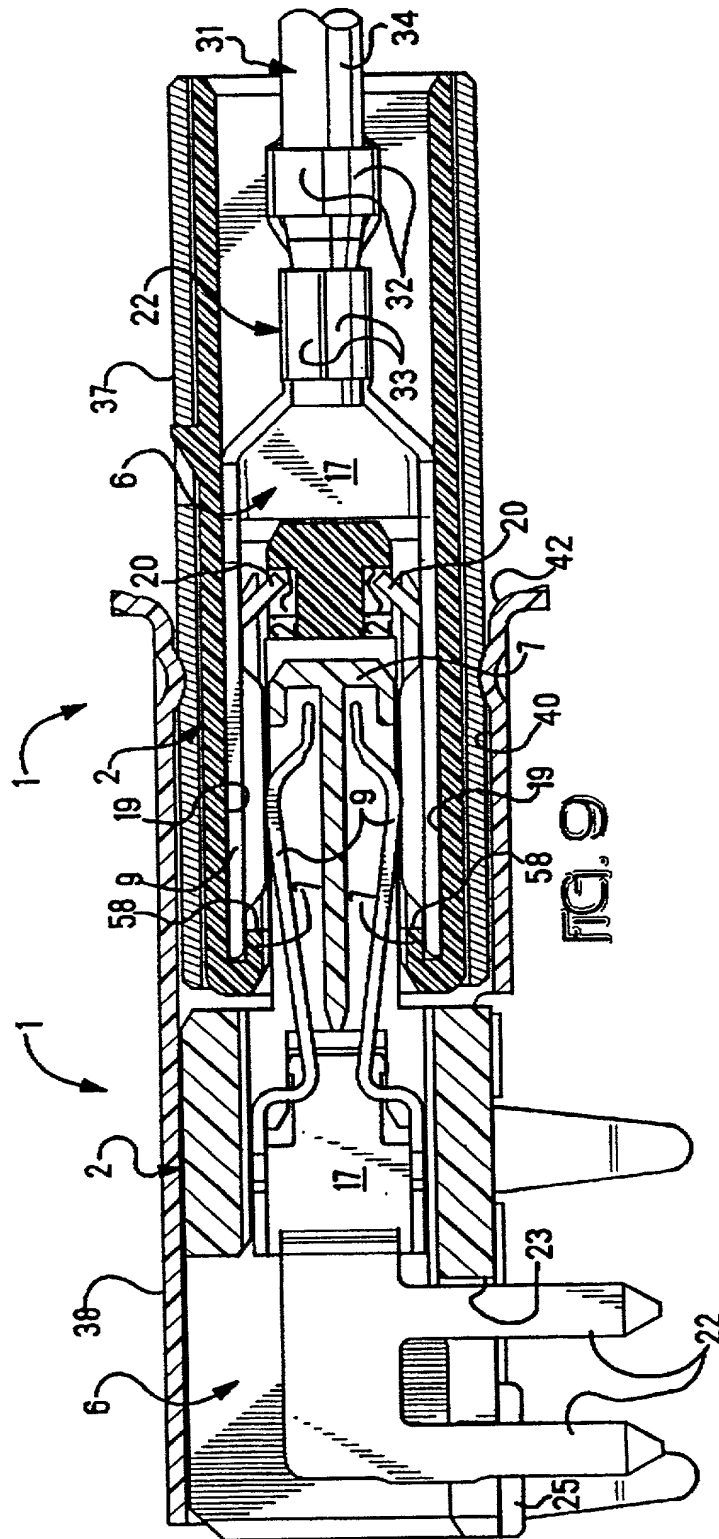


FIG. 8





IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION FOR REISSUE APPLICATION  
UNDER 37 CFR 1.63 AND 37 CFR 1.175  
AND POWER OF ATTORNEY

As a below named inventor, I hereby declare, of my own knowledge or on information and belief, that:

My residence, post office address and country of citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is described and claimed in U.S. Patent No. 5,785,557, granted July 28, 1998, and for which a reissue patent is sought on the invention entitled:

ELECTRICAL CONNECTOR WITH PROTECTION FOR  
ELECTRICAL CONTACTS

the specification of which is attached hereto.

I have reviewed and understand the contents of the attached specification, including the claims, as amended by any amendment specifically referred to in the declaration;

I verily believe the original patent to be wholly or partly inoperative or invalid by reason of claiming less than I have a right to claim in the patent. The claims contain excess limitations not necessary for patentability. For example, at least one error in the prior patent is that the claims contain excess limitations concerning wiping surfaces on the housing not necessary for distinguishing over the prior art. Also, the claims fail to cover embodiments of the invention as claimed in the above identified application for reissue. For example, the claims fail to cover mateable electrical connectors comprising a first and a second electrical connector having mateable signal contacts and at least one first power contact mateable with at least one second power contact, the first power contact having opposed contact fingers extending from a first body portion and the second power contact having opposed contact surfaces, wherein the opposed contact fingers of the first power contact are received between the opposed contact surfaces of the second power contact such

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that the contact fingers resiliently deflect inwardly and exert pressure on the opposed contact surfaces.

I attest that all errors being corrected in this reissue application up to the time of filing of this declaration arose without any deceptive intention of the applicant.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in 37 CFR 1.56. That is, I acknowledge that a patent by its very nature is affected with a public interest; that the public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware and evaluates the teachings of all information material to patentability. I acknowledge that, as an inventor and an individual associated with the filing and prosecution of a patent application, I have a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to me to be material to patentability. I acknowledge that this duty exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or until the application becomes abandoned. I further acknowledge that the duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by regulation. However, I recognize that no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. I further acknowledge that the Office encourages applicants to carefully examine:

- (1) Prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

I acknowledge that information is considered to be material to patentability when it is not cumulative to information already of record or being made of record in the application, and it establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or it refutes, or is inconsistent with a position the applicant takes in opposing an argument of unpatentability relied on by the Office, or

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asserting an argument of patentability. A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

I hereby claim the benefit under 35 U.S.C. §120 of the prior application identified below, this application being a continuation-in-part of the following prior application:

U.S. Serial No: 08/005,690  
U.S. Filing Date: January 19, 1993  
Issued as U.S. Patent No. 5,295,843

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in 37 CFR 1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true, and I am warned, in accordance with 37 CFR 1.68, that willful false statements and the like are punishable by fine or imprisonment, or both, (18 U.S.C. §1001) and may jeopardize the validity of the application or any patent issuing thereon.

I hereby appoint Michael J. Aronoff (Registration No. 37770), Bradley N. Ditty (Registration No. 40994), Stephen J. Driscoll (Registration No. 37564), Robert J. Kapalka (Registration No. 34198) and Driscoll A. Nina (Registration No. 34685) whose post office address is: Tyco Technology Resources, 4550 New Linden Hill Road, Suite 450, Wilmington, DE 19808-2952, or their duly appointed associate, my attorneys or agents with full powers of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the Letters Patent, and to transact all business in the U.S. Patent and Trademark Office in connection therewith.

WSJ  
7-27-93

Direct all correspondence to the address:

**Tyco Technology Resources**  
**4550 New Linden Hill Road**  
**Suite 450**  
**Wilmington, Delaware 19808-2952**

<u>Wayne Samuel Davis</u>	<u>Wayne Samuel Davis</u>	<u>7-27-00</u>
Full Name of Inventor	Inventor's Signature	Date
<u>USA</u>	<u>/4108 North 6<sup>th</sup> Street, Harrisburg, PA</u>	<u>17110</u>
Citizenship	/ Residence	
<u>4108 North 6<sup>th</sup> Street, Harrisburg, PA 17110</u>		
Post Office Address		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

-----X

In the Matter of the Application for Reissue of:

Wayne Samuel Davis

U.S. Patent No. 5,785,557

Issued: July 28, 1998

For: ELECTRICAL CONNECTOR WITH PROTECTION

FOR ELECTRICAL CONTACTS

-----X

Assistant Commissioner for Patents

Washington, DC 20231

**ASSIGNEE'S STATEMENT UNDER 37 CFR 3.73(b);  
ASSENT OF SOLE ASSIGNEE OF UNDIVIDED INTEREST IN  
U.S. PATENT NO. 5,785,557 TO FILE APPLICATION FOR REISSUE;  
OFFER TO SURRENDER THE ORIGINAL LETTERS PATENT; AND  
POWER OF ATTORNEY**

Sir:

The undersigned sole assignee, The Whitaker Corporation, hereby provides evidence of its entitlement to act in the reissue application identified above in the heading, as required under 37 CFR 1.172(a) and 3.73(b). A copy of the assignment of all rights in the reissue application can be found at Reel 6418 and Frame 0281. A party authorized to act on behalf of the Assignee has signed this submission establishing ownership.

The Whitaker Corporation hereby assents to the reissue application identified above in the heading.

The Whitaker Corporation, on whose behalf and with whose assent the reissue application identified above in the heading is made, hereby offers to surrender said Letters Patent upon allowance of one or more corresponding reissue applications.

The Whitaker Corporation hereby revokes all prior Powers of Attorney, asserts its sole right to control prosecution of the present reissue application, and appoints the following attorneys and agents to prosecute the reissue application identified above in the heading and to transact all business in the Patent and Trademark Office connected therewith:

Michael J. Aronoff	Reg. No. 37770
Bradley N. Ditty	Reg. No. 40994
Stephen J. Driscoll	Reg. No. 37564

Robert J. Kapalka  
Driscoll A. Nina

Reg. No. 34198  
Reg. No. 34685

Direct all correspondence to the address below:

Tyco Technology Resources  
4550 New Linden Hill Road  
Suite 450  
Wilmington, Delaware 19808-2952

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application, any patent issued thereon, or any patent to which this declaration is directed.

The Commissioner is hereby authorized to charge any fees that are presently required, or credit any overpayment, to Deposit Account No. 23-1950.

Respectfully submitted,  
The Whitaker Corporation

Date: July 28, 2000

By: Melissa K. Donnelly 

Melissa K. Donnelly

(Print Name)

Assistant Secretary

(Title)